

Title: Heritability and genetic gain from selection for resistance to *Bipolaris* leaf spot in switchgrass

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Bipolaris leaf spot, caused by *Bipolaris oryzae* (Breda de Haan) Shoemaker, is one of the major foliar diseases of switchgrass (*Panicum virgatum* L.). The disease can reduce germination as much as 80% and biomass production up to 50%. Breeding switchgrass for resistance to leaf spot is a sustainable approach to maintain adequate yields; thus, heritability of resistance to *Bipolaris* leaf spot and genetic gain of selection were estimated. Disease severity was evaluated in a greenhouse by artificial inoculation with a 10^4 conidia/mL suspension on 3-week-old switchgrass seedlings and then covered with a clear plastic bag for 24 hours to increase humidity. The percentage of a leaf covered by lesions (PLC) was measured one week later. The cycle 1 of 'Kanlow' (KLC1), which was selected from cycle 0 (KLC0) with 33% selection intensity, was used to estimate realized heritability, calculate actual gain of selection, and compare with 'Cave-in-Rock' (CIR), 'Blackwell' (BW), and 'Shelter' (ST). In the comparison with the mean of PLC, ST showed the most resistance (16%) which was significantly different from BW, KLC1, KLC0 and CIR (24, 25, 27, and 28%, respectively). The low realized heritability (0.12) and low gain between KLC1 and KLC0 (7.57%) suggested that 33% selection pressure was not enough to make the progress of resistance to leaf spot in tetraploid switchgrass. Therefore future selection experiments will utilize 10% selection intensity through two cycles of recurrent phenotypic selection in two plant populations.